February 20, 1977

Study of Decomposition of Mevinphos (Phosdrin) Residue on Lettuce in the Salinas Valley of Monterey County, California June 1974

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CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE
DIVISION OF INSPECTION SERVICES

STUDY OF DECAY RATE OF PHOSDRIN APPLIED TO LETTUCE

DATE:	June 19, 1974 (Wednesday)
WEATHER:	Clear, sunny, 70°F at 10:30 a.m. 72° maximum, and 47° minimum for June 19-22.
LOCATION:	Los Coches Ranch, Farmed by Major Farms, 2 miles south of Soledad in Monterey County
CROP:	Head lettuce to be harvested in four days
RECOMMENDATION TO CROP OWNER BY ADVISOR:	In writing: Do not harvest for two days.
REASON FOR APPLICATION:	Clean up of Aphids prior to harvest
SIZE OF FIELD:	20 acres
PESTICIDE:	Soil Serv Phosdrin - 4 E Contains four pounds Phosdrin per gallon, 26.40% active ingredients (Base pesticide purchased from Shell Chemical Company.)
REGISTRATION NUMBER:	0673 - 50082 AA
APPLICATION RATE:	1 pint per acre in 10 gallons water (Total of 2-1/2 gallons - 20 pints - pesticide used)
APPLICATION VEHICLE:	Helicopter with a 60 gallon fiberglass tank made of Translan, made by Agrivinco
LICENSED APPLICATOR:	Pilot - William Lackey working for Atwood Aviation on subcontract to Soil Serv
APPLICATION PERIOD:	9:30 a.m. to 10:00 a.m.

SAMPLES
(Each time, 2 complete heads and 80 discs of wrapper leaves of 80 different heads were collected)

June 19, 1974 Pre Sampling 9:00 a.m.

(Application completed 10:30 a.m.)

1st Post Application Sample	11:30 to 12:00 noon	1 hour
2nd Post Application Sample	1:40 to 2:00 p.m.	2 hours
3rd Post Application Sample	3:45 to 4:00 p.m.	4 hours
4th Post Application Sample	7:45 to 8:15 p.m.	6 hours
June 20		
5th Post Application Sample	11:30 to 12:00 noon	10 hours
June 21		
6th Post Application Sample		24 hours
June 22		
7th Post Application Sample		48 hours

LABORATORY ANALYSIS

PPM OF PHOSDRIN RESIDUE

Sampling Interval From Time of Application	WRAPPER LEAVES OF LETTUCE			TOTAL HEADS OF LETTUCE	
	Dislodgable Residue	Penetrated Residue	Total Residue	Total Residue	
1 Hour Before	< 0.1	< 0.1	< 0.1	< 0.1	
Hours After					
2	18.8	25.8	44.6	4.5	
4	14.2	12.6	26.8	13.5	
6	15.7	14.4	30.1	6.8	
10	*32.8	4.0	36.8	13.3	*Sample frozen over-night
24	4.1	4.1	8.2	2.9	
48	0.5	0.4	0.9	0.2	

FIGURE 1: PHOSDRIN RESIDUE ON LETTUCE IN MONTEREY COUNTY
JUNE 1974

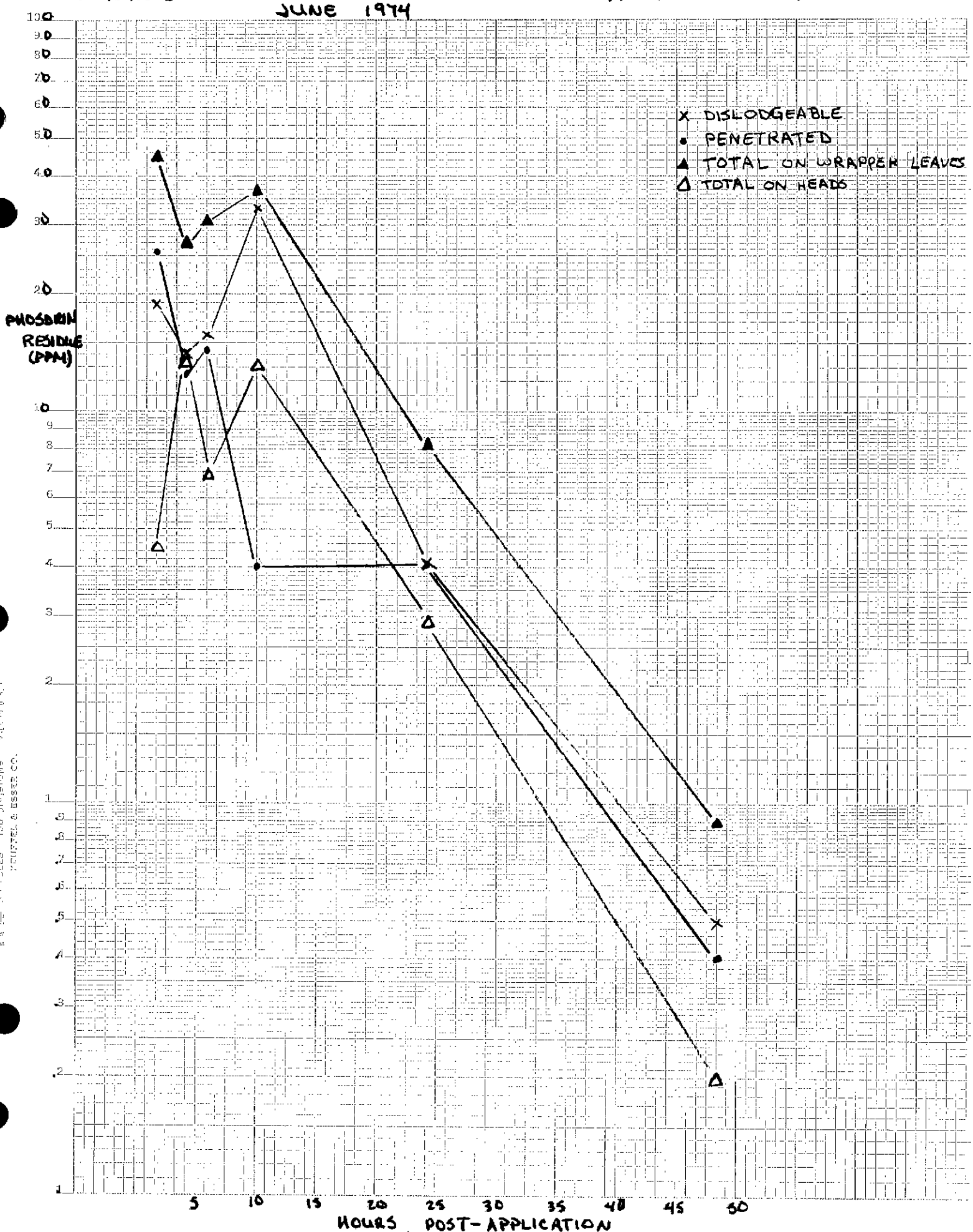
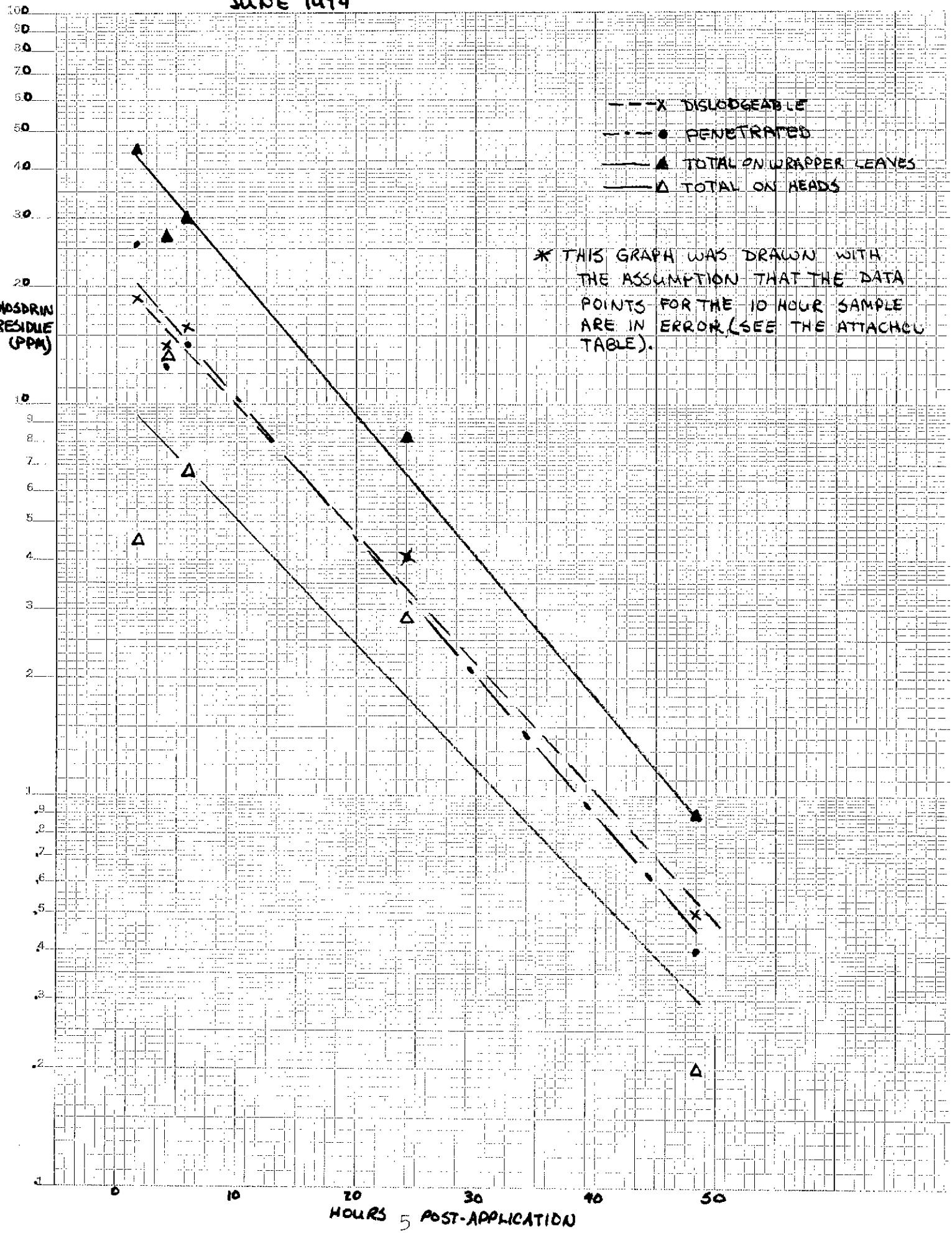


FIGURE 1a: PHOSDRIN RESIDUE ON LETTUCE IN MONTEREY COUNTY
JUNE 1974



CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE
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STUDY OF DECAY RATE OF PHOSDRIN APPLICATION TO LETTUCE

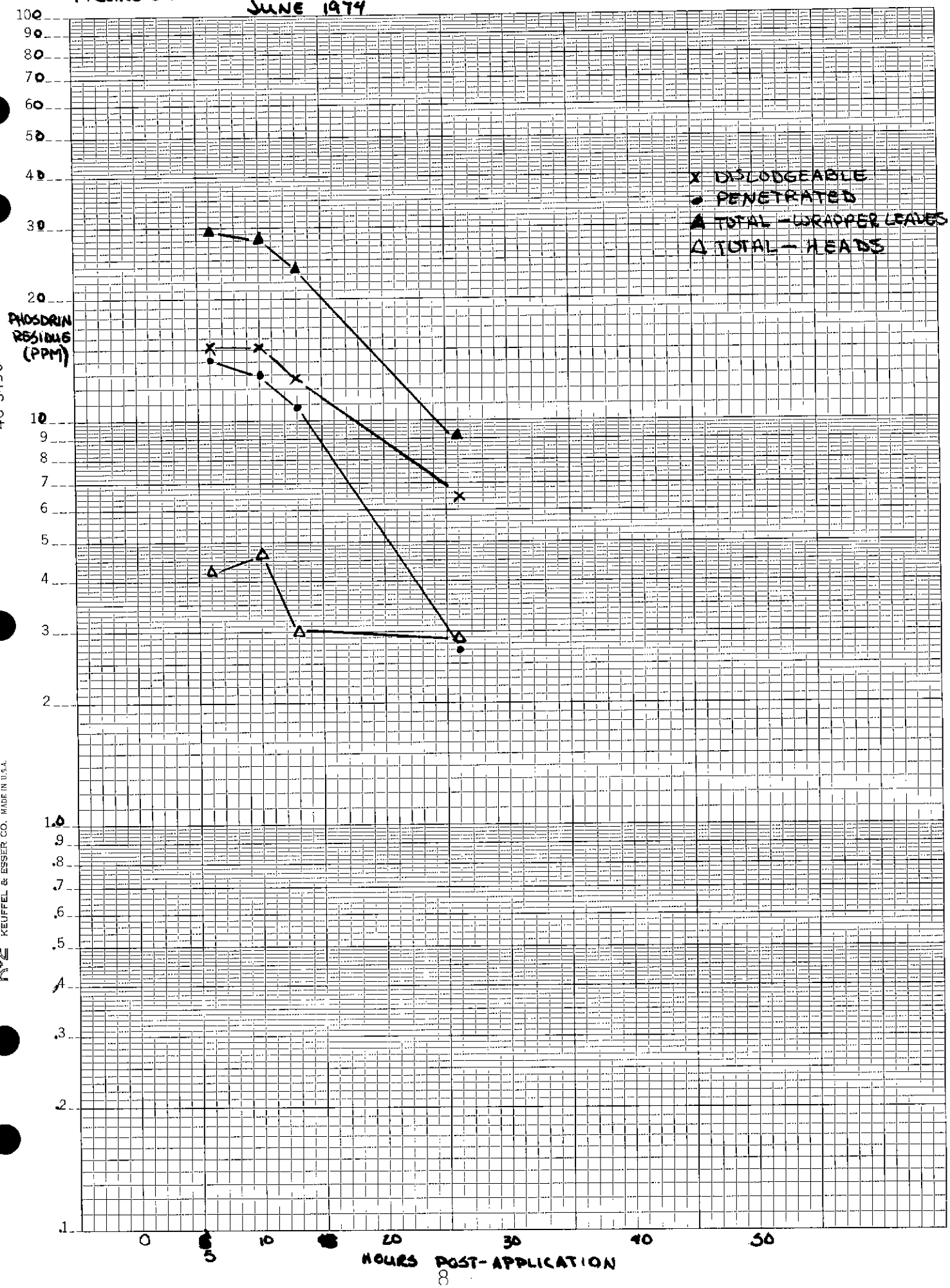
DATE:	June 20, 1974
TYPE OF CROP:	Lettuce - ready for harvest
LOCATION:	1 mile west of Salinas in Monterey County
WEATHER:	Clear, sunny, up to 71°F daytime, down to 48°F at night June 20 and 21.
FARM:	Salmina Ranch 6 and 6A County number 27, Base and Meridian M
GROWER:	Interharvest
SIZE OF FIELD:	28 acres
VOLUME:	10 gallons spray per acre reportedly containing 1 quart of pesticide per acre. (The pesticide mixing and loading was not observed because of a misunderstanding of the hours of application. In looking at the data, it appears that only 1 pint per acre was applied. The study was terminated after 26 hours, and it will be repeated later.)
PEST CONTROL ADVISOR:	Schrage
PREHARVEST INTERVAL WARNING PROVIDED BY ADVISOR:	(Written) "Do not harvest for four days - same applies to adjoining crops."
PESTICIDE:	Soil Serv Phosdrin
PEST:	Aphid (Preharvest clean up spray.)
TOTAL AMOUNT OF PESTICIDE TO BE USED:	7 gallons recommended
PEST CONTROL OPERATOR:	Soil Serv Inc., Salinas
SUBCONTRACTED TO:	Greenbelt Aviation; operated by Gordon Plaskett
APPLICATOR VEHICLE:	Helicopter
LICENSED PILOT:	Ronald Long
APPLICATION DATE:	June 20, 1974, Thursday
APPLICATION TIME:	6 a.m.
SAMPLES COLLECTED AFTER APPLICATION:	6 hours 10 hours 13 hours 26 hours

LABORATORY ANALYSIS

PPM OF PHOSDRIN RESIDUE

Sampling Interval From Time of Application	WRAPPER LEAVES OF LETTUCE			TOTAL HEADS OF LETTUCE
	Dislodgable Residue	Penetrated Residue	Total Residue	Total Residue
Before Application	< 0.1	< 0.1	< 0.1	< 0.1
Hours After Application				
6	15.3	14.2	29.5	4.3
10	15.2	13.1	28.3	4.7
13	12.9	10.9	23.8	3.0
26	6.5	2.7	9.2	2.9

FIGURE 2 : PHOSDRIN RESIDUE ON LETTUCE IN MONTEREY COUNTY
JUNE 1974



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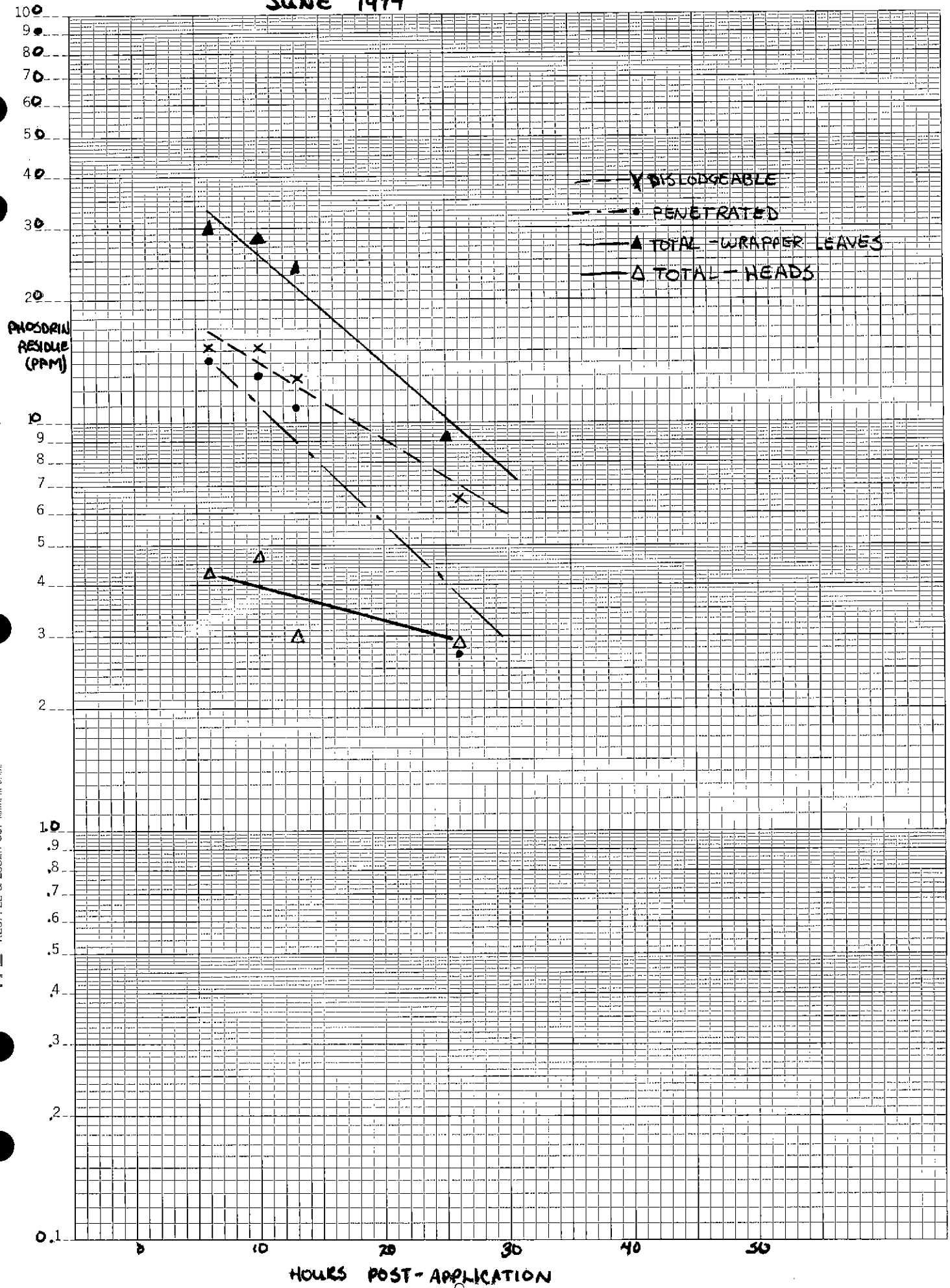
KEUFFEL & ESSER CO. MADE IN U.S.A.

FIGURE 2a: PHOSDRIN RESIDUE ON LETTUCE IN MONTEREY COUNTY
JUNE 1974



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SAMPLING PROCEDURE

Samples were collected at 2, 4, 6, 10, 24 and 48 hours post-application in Sample 1, and 6, 10, 13, and 26 hours post-application in Sample 2. Each sample consisted of 80 leaf discs, 2.5 cm in diameter from the wrapper leaves of 80 different heads of lettuce and two complete heads.

Leaf samples were analyzed for dislodgeable, penetrated, and total residues. The complete heads were anlayzed for total residue only.

ANALYTICAL METHODS

The procedure used for the extraction of dislodgeable, penetrated, and total residues from leaf punches was originally published by Gunther in "The Bulletin of Environmental Contamination and Toxicology," 9, 243-249, 1973. It has been documented several times in detail, with modifications that were made to accommodate the various pesticides and their metabolites that Worker Safety has been concerned with.

The sample container and leaf punches are weighed and the gross weight recorded.

DISLODGEABLE RESIDUES

1. Fifty mls of water and approximately 4 drops of Sur-Ten solution (1:50) is added to the sample containers. The containers are capped and placed in a multi-purpose rotator and rotated at 30 cycles/min. for 60 min. The aqueous solution is decanted through a glass wool plug into a 500 ml separatory funnel.

2. The punches are rotated a second time, using 50 mls of water and 4 drops of Sur-Ten solution, for 30 min. This is added to the first extraction.

3. The sample is then hand-shaken for approximately 10 seconds with 30 mls of water. The container is drained into the separatory funnel with the first two extractions.

4. The aqueous solution is extracted three times with 50 ml of $CHCl_3$. Shake carefully to avoid emulsions. The solvent is filtered through sodium sulfate into a glass stoppered mixing cylinder and the volume is recorded. The solvent is mixed in the cylinder. An aliquot is decanted into a teflon-capped bottle and stored in the freezer prior to cleanup and analysis.

PENETRATED RESIDUE

1. After the last water rinse is drained for the dislodgeable residue, the punches are transferred to a blender jar. The empty sample container is weighed and the net weight of the punches recorded.

2. Approximately 50 gms of sodium sulfate and 100 mls of ethylacetate are added.

3. The sample is blended at high speed for 3 minutes, keeping the blender cup cool by immersing it in a container of cool water. The blender cup is removed and the sample allowed to settle.

4. An aliquot is decanted into a teflon capped bottle and stored in the freezer prior to cleanup and analysis.

TOTAL RESIDUE

The total residues on the wrapper leaves were calculated by adding the penetrated and the dislodgeable residues.

Total residues for the complete heads were analyzed as follows:

1. The representative samples from the heads are weighed and the weight is recorded. The sample is then transferred to a blending jar.

2. Approximately 50 gms of sodium sulfate and 100 mls of organic solvent are added.

3. The sample is blended at high speed for 3 minutes, keeping the blender cup cool by immersing it in a container of cool water. The blender cup is removed and the sample allowed to settle.

4. An aliquot is decanted into a teflon capped bottle and stored in the freezer prior to cleanup and analysis.

GLC CONDITIONS

Varian 2700, FPD detector, standard flow, 6' x 2 mm I.D. of 3% OV-275, 100/120 Chrom W(HP)

Column temperature: 160^{o}

Carrier gas N_2 @ 30 cc/min.